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Absorption and Luminescence of Stilbene Impurity in Tolane
Crystals at 20.4°K.

the remaining transitions and become the beginning for all series. The absorption bands remain narrow and sharp, although they are somewhat broadened on increase of stilbene concentration. From these results the fundamental frequencies of intramolecular vibrations of stilbene are determined. The general nature of luminescence of stilbene (1%) in tolane is shown in Fig.2. The spectrum begins with a pair of very weak lines of frequencies 29672 and 29620 cm^{-1} . Part of the luminescence spectrum is given in Fig.3. Table 3 gives the luminescence of stilbene in tolane at 20.4 K. The first column gives a rough intensity value; the second column gives the frequency; third, fourth and fifth columns give various frequency

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differences. If the three series, which begin at 29672, 29528 and 29468 cm^{-1} , are separated out from the luminescence spectrum, then the frequencies of intramolecular vibrations of stilbene in tolane are found to be close to the corresponding frequencies obtained from the Raman spectrum and from luminescence of stilbene in dibenzyl. Stilbene and tolane form a continuous series of solid solutions (Ref.6), since their lattices are practically identical. Introduction of stilbene molecules into the lattice sites produces "defects" which become absorption centres. This accounts for the spectral peculiarities of tolane crystals with stilbene impurity which were described Card 4/5 above. The authors note that tolane itself does not

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luminesce, but luminescence occurs only from the impurity levels. In the absorption and luminescence spectra of cadmium sulphide (Ref.5) the same peculiarities are observed as in tolane with stilbene. The difference between CdS and stilbene-tolane lies in the fact that the "defects" in the former are due to an excess of sulphur or cadmium, while in the latter the "defects" are stilbene molecules. There are 3 tables, 3 figures and 7 references, of which 6 are Russian and 1 French.

ASSOCIATION: Institute of Physics, Academy of Sciences of the Ukrainian SSR. (Institut fiziki AN USSR.)

SUBMITTED: March 25, 1957.

AVAILABLE: Library of Congress.

Card 5/5 1. Tolane crystals-Stilbene Absorption 2. Tolane crystals-Stilbene-luminescence

51.4 - 3-3/30

AUTHORS: Prikhod'ko, A.F. and Fugol', I. Ya.

TITLE: Luminescence of Crystalline Anthracene at $T = 20.4^{\circ}\text{K}$.
(Iyuminestsentsiya kristallicheskogo antratsena pri $T = 20.4^{\circ}\text{K}$.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3,
pp.335-343 (USSR)

ABSTRACT: Over 30 samples of anthracene crystal plates of various thicknesses (from tenths of a micron to several mm) were studied. Thicker plates were cut from a large monocrystal; thin crystals were obtained by evaporation. To avoid the effects of thermal stresses which occur on cooling of anthracene crystals attached to quartz bases, only the crystals of thickness greater than $1\ \mu$ were used to study the luminescence spectra. To find the effect of the state of the surface on luminescence, samples with damaged surfaces (cracked, bent, etc.) were studied as a special group. Measurements were made at 20.4°K in a metal cryostat with quartz windows (Ref.5). The luminescence spectra were recorded both with the exciting light incident at an angle to the sample and after "transmission" through the sample. In the first

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Luminescence of Crystalline Anthracene at $T = 20.4^{\circ}\text{K}$.

case luminescence was excited with light of about 3670 \AA . For obtaining luminescence by "transmission" a tungsten lamp was used. A Glan-Thomson prism was used to separate out the components of luminescence parallel ("b" component) and normal ("a" component) to the monoclinic b-axis of the crystal. The luminescence spectra were recorded by means of an ISP-22 spectrograph. The authors observed also the long-wavelength absorption by anthracene at 20.4°K . Frequencies of the absorption lines are given in Table 1, which includes the results obtained at 20.4°K by Obreimov and Prihot'ko (Ref.6) and by Craig and Hobbins (Ref.7), as well as Sidman's (Ref.3) results obtained at 4°K . Large differences between the results obtained by the various authors can be seen in Table 1. The luminescence spectrum of anthracene at 20.4°K consists of narrow bands which are practically lines. The frequencies of the most intense lines are given in Table 2. Fig.1 gives the distribution of intensity in the anthracene luminescence spectrum at 293°K (curve 1) and at 20.4°K (curve 2). It was found

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Luminescence of Crystalline Anthracene at $T = 20.4^\circ\text{K}$.

that the intensity of luminescence in the "b" direction is greater than in the "a" direction and the ratio of the intensities of various bands in the two components of the spectrum is not the same (see Fig.2). The authors found considerable variations in luminescence of crystalline anthracene samples which were held in the same way and had no visible surface damage (Fig.3 and Table 3). In thick samples a more complete set of luminescence lines was observed than in thin samples. The luminescence spectra of samples with damaged surfaces are shown in Fig.4. Samples with cracks of several microns thickness had lines which were more diffuse than all samples with undamaged surface. The observed variations in luminescence are ascribed to variations in local levels which are formed in crystals due to various lattice defects (vacancies, interstitial molecules, etc.) and which are responsible for luminescence. These defects can behave like impurity centres. It is considered unlikely that the observed variations are due to uncontrolled impurities in anthracene. There are 4 figures, 3 tables and 12

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Luminescence of Crystalline Anthracene at $T = 20.4^{\circ}\text{K}$.

references, of which 7 are Soviet, 4 American and 1 French.

ASSOCIATION: Institute of Physics, Academy of Sciences of the Ukrainian SSR. (Institut fiziki AN USSR.)

SUBMITTED: May 29, 1957.

1. Anthracene crystals--Luminescence

Card 4/4

00 / 1 - 1 / 20

AUTHORS: Bronde, V.L., Izraelovich, Ye.A., Liberman, A.L., Ononipenko, M.I.,
Pakhomova, O.S., Prikhov'ko, A.F., and Shatenshteyn, A.I.

TITLE: On Electron Spectra of Aromatic Hydrocarbons and their Deuterated
Derivatives at 20°K (Ob elektronnykh spektrakh aromaticheskikh
uglevodorodov i ikh deuterirovannykh proizvodnykh pri 20°K)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 2, pp 115-122 (USSR)

ABSTRACT: The present paper is the first of a series on the ultraviolet
absorption spectra of deuterated compounds and the changes in the
molecular and crystal structure produced by deuteration. To obtain
the hyperfine structure and to observe the small isotopic shifts
measurements were made at 20°K. The work reported here is also an
extension of the application of the deuteration methods based on the
isotopic exchange of hydrogen with liquid deuterium bromide or with
a solution of KMD₂ in liquid MD₃ (Refs 4-10). The results are given
in Table 1 which shows that using such methods all kinds of hydrocarbons
in diphenyl, naphthalene, toluene, n-xylene, durene, penta- and
hexamethylbenzene may be replaced by deuterium. The preparation
followed the method described in Ref 10, which gives the method of

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On Electron Spectra of Aromatic Hydrocarbons and their Deuterated Derivatives

calculation of the number of replaced hydrogen atoms n in a hydrocarbon molecule. The last column of Table 1 shows that the number n differs only a little from the total number of hydrogen atoms in the hydrocarbon molecule in question. The following hydrocarbons were deuterated: benzene, toluene, m-xylene, n-xylene, mesitylene, durene, hexamethylbenzene, naphthalene, phenanthrene, diphenyl. The constants, such as the boiling point^{and} refractive index, of the original and deuterated substances are given in Table 2. Using polarized light the authors obtained the electron spectra of the crystals listed in Table 2 (both in deuterated and non-deuterated forms). Measurements were made at 20°K and the results are shown in Figs 1-7. The spectral changes produced by deuteration are due, firstly to changes in the energy states of molecules, and secondly to changes in the crystal structure. The first produce spectral shifts towards the short wavelengths by some 100-200 cm^{-1} and a decrease of frequencies of the molecular vibrations by a factor of 1.04-1.15. The crystal structure changes show up in the polarization ratios for the absorption bands and in the change of spacing between strongly polarized bands. A.L. Liberman (Institute of Organic Chemistry, Academy of Sciences of the U.S.S.R.) prepared pure benzene and alkylbenzenes. A.I. Shatenshteyn and Ye.A. Izrailevich

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SOV/51-5-2-3/26

On Electron Spectra of Aromatic Hydrocarbons and their Deuterated Derivatives at 20°K

(Physico-Chemical Institute imeni Karpov) prepared deuterated compounds. V.L. Broude, M.I. Onopriyenko, O.S. Pakhomova and A.F. Prihot'ko (Institute of Physics, Academy of Science of the Ukrainian S.S.R.) obtained and interpreted the electron spectra. The authors thank Yu. Antonchik for density measurements of the deuterated hydrocarbons and P. Manochkina for help in deuteration of the hydrocarbons. There are 7 figures, 2 tables and 16 references, 14 of which are Soviet, 1 American and 1 English.

ASSOCIATION: Institut fiziki AN UkrSSR; Fiziko-khimicheskiy institut im. Karpova
(Institute of Physics, Academy of Sciences of the Ukrainian S.S.R.;
Physico-Chemical Institute imeni Karpov)

SUBMITTED: July 16, 1957

Card 3/3 1. Hydrocarbons-d--Spectrographic analysis 2. Ultraviolet spectrum
--Applications

SOV/51-5-2-4/26

AUTHORS: Brodin, M.S., Pakhomova, O.S. and Prikhod'ko, A.F.

TITLE: Absorption of Light by Stilbene Crystals at 20°K (Pogloshcheniye sveta kristallami stil'bena pri 20°K)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 2, pp 123-127 (USSR)

ABSTRACT: The authors obtained and analysed the absorption spectrum of crystalline stilbene at 20°K. The crystals were prepared by sublimation and were attached to quartz glass plates. The spectra were photographed in polarized light using an ISP-22 quartz spectrograph. A hydrogen lamp with a "uviolet" window or a krypton lamp GSVD-120 were used as light sources. Iron spectrum was used for calibration. A FEU-18 photomultiplier was used as the receiver. Photographs of the two polarized components of the absorption spectrum (at 20°K) of a stilbene monocrystal, 0.2 μ thick, are shown in Fig 1. Fig 2 gives the absorption curve of a stilbene crystal at 20.4°K for vibrations parallel to the N_p axis. Fig 3 gives the absorption spectra of a stilbene crystal (curve 1) and a solid solution of stilbene in toluene (curve 2) at 20°K (vibrations parallel to the N_g axis). The authors make the following deductions from Fig 3. (1) The intensity of the first (purely electronic) band, as compared with the other bands, is considerably greater in the

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Absorption of Light by Stilbene Crystals at 20°K

crystal spectrum than the intensity of the corresponding band in the solid solution spectrum. (2) 770 cm^{-1} vibration frequency is present in the pure crystal spectrum. The same vibration has a frequency of 745 cm^{-1} in the solid solution of stilbene in dibenzyl but it is absent in the solid solution of stilbene in toluene. (3) The bands corresponding to the harmonics of the 1590 cm^{-1} vibrations are stronger than the fundamental bands in the N_g -component of the pure crystal spectrum, but they are weaker in the solid solution spectra. The authors used crystals in optical contact with quartz plates or layers produced by melting between two quartz plates. In both cases cooling to the liquid-hydrogen temperature produced considerable mechanical strain due to the difference between the thermal expansion coefficients of quartz and stilbene. Such strains affect polarization of separate bands and their spectral position. The vibrational structure, however, is practically unaffected but the purely electronic bands are altered considerably and this has to be allowed for in making of any deductions. There are 3 figures and 5 Soviet references.

Card 2/2

ASSOCIATION: Institut fiziki, AN UkrSSR, g. Kiyev (Institute of Physics, Academy of Sciences of the Ukrainian S.S.R., Kiyev) 1. Stilbene crystals--Preparation
SUBMITTED: September 14, 1957 2. Single crystals--Spectrographic analysis

SOV/51-5-5-13/23

AUTHORS: Prikhot'ko A.F. and Fugol', I.Ya.

TITLE: Absorption and Luminescence of Phenanthrene Crystals at 20°K.
(Pogloshcheniye i lyuminesstsiya kristallov fonantrena pri 20°K,

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 582-589 (USSR;

ABSTRACT: The authors obtained absorption and luminescence spectra of phenanthrene at 20°K. They used a quartz spectrograph of high dispersion (Hilger-E₁). The luminescence spectrum was obtained on that side of the crystal which was excited with 3100 Å from a mercury lamp. The absorption coefficients were measured by photographic photometry for two directions of polarization: parallel (direction b, and at right-angles (direction a) to the monoclinic b-axis. The absorption spectra of phenanthrene crystals from 0.2 to 12 μ thick were measured in the same two directions. Phenanthrene crystals which absorb weakly in the first electron transition (28000-33000 cm⁻¹) exhibit an absorption spectrum which consists of narrow bands. In 0.5-0.3 μ thick crystals the absorption spectrum is very simple (Fig 1). With increase of crystal thickness the spectrum becomes more complex, as shown in Fig 2

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Absorption and Luminescence of Phenanthrene Crystals at 20°K

which gives the spectrum of a 2.5 μ thick crystal. In Figs 1 and 2 the spectra marked "a" represent absorption with the E vector parallel to the b-axis, and the spectra marked "b" represent absorption with the E vector normal to the b-axis. Fig 3 gives the absorption curves for phenanthrene at 20°K; the continuous line represents the results for direction b and the dashed line represents the a-direction spectrum. Table 1 gives the absorption spectrum of phenanthrene in the region 28000-33000 cm^{-1} ; the first two columns give the absorption coefficients, the third column gives the wave-number in cm^{-1} , the fourth column gives the difference between the wave-number of a particular band and the 28610 cm^{-1} band. For the a- and b-directions in phenanthrene the following oscillator strengths were obtained for the first electron transition at 20°K: $f_a = 0.0033$, $f_b = 0.008$. Phenanthrene crystals luminesce strongly when illuminated with light of wavelengths in the absorption region. Most of this luminescence is due to anthracene which is present as an impurity. When the anthracene concentration is less than 0.01% the anthracene emission disappears. The intrinsic luminescence of phenanthrene, which is then observed, consists of wide and partially diffuse bands. All the measured fluorescence bands

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and their interpretation are given in Table 2. The first band of the luminescence series coincides with one of the weak absorption bands in the long-wavelength region, as shown in Fig 4. Phenanthrene does not exhibit the same randomness in its luminescence spectrum as that shown by anthracene and cadmium sulphide. Nevertheless the similarity between the absorption and luminescence spectrum of phenanthrene suggests that luminescence of phenanthrene has the same origin as that of anthracene (Ref 1) and cadmium sulphide (Ref 10), i.e. it is due to lattice defects. There are 4 figures, 2 tables and 10 references, 8 of which are Soviet and 2 American.

SUBMITTED: December 9, 1957

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1. Phenanthrene crystals--Spectra 2. Phenanthrene crystals
--Luminescence 3. Phenanthrene crystals--Lattices

24(2), 2417)

SOV/48-22-11-7/53

AUTHOR: Prikhot'ko, A. F.

TITLE: Spectral Investigations of Crystals (Spektral'nyye issledovaniya kristallov)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1312-1315 (USSR)

ABSTRACT: Spectroscopic and optical investigations occupy an important place in the modern physics of non-metallic bodies. They facilitate an immediate examination of the energy level structure of the crystals, an observation of processes taking place in crystals and an investigation of the mechanisms of a number of phenomena, in particular of luminescence and of photoconductivity. Systematic investigations of crystal spectra were initiated by the paper by I. V. Obreimov (Ref 1). The intrinsic absorption of anisotropic crystals is of a pleochroic nature. Numerous, if, however, not all of the bands in their spectra are largely polarized. The exciton nature of excitation in crystals plays a great role in the consideration of absorption and in particular of luminescence. When light is absorbed the crystal takes in energy, which is determined by its electron- and

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oscillation levels. The latter can in molecular crystals be distributed approximately evenly on intra- and intermolecular levels. The essential feature is that spectra of highly light-absorbing compounds occur as series of lines. They offer an important source of information on intramolecular oscillations (Refs 5,6). In any case the spectral lines emitted by crystals are superimposed on a continuous background. The greater the interaction of the excitations and the greater the strength of the transitions, the more pronounced will be this background. A weakening of the background with decreasing temperature permits to connect it with phonons, that is to say, with lattice oscillations. Excited crystals emit the acquired energy in a spontaneous return to the normal state. This energy is transformed into heat, luminescence, photocurrent, or it is consumed in photochemical transformations. Photoconductivity dominates in semiconductors, luminescence in luminophors. If the serial intrinsic absorption of crystals and their luminescence are minutely compared, a frequency gap is found between the starting points of the two spectral series, which cannot be explained even by having recourse to the re-absorption of luminescence. The common nature of the processes in crystals of different

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crystals is due to the common nature of their crystal structure. The disturbance of the transition symmetry of the crystal. Crystal spectra are extremely sensitive to such disturbances as well as to various external actions. Different structural changes also manifest themselves in the crystal spectra. These facts all contribute to a widening of the scope of crystal spectroscopy. Owing to the development of the theory of absorption and dispersion in media in which the crystal structure is possible, detailed investigations of these phenomena were carried out. These investigations have already furnished some results. There are 12 references, 11 of which are listed.

ASSOCIATION: Institut fiziki Akademii nauk USSR (Institute of Physics, USSR)

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SOV/120-59-1-28/50

AUTHORS: Babenko, V. P., Broude, V. L., Medvedev, V. S., Prikhot'ko, A. F.

TITLE: Methods and Apparatus for Low Temperature Optical and Spectral Studies (Metody i apparatura nizkotemperaturnykh opticheskikh i spektral'nykh issledovaniy)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, pp 115-120
(USSR)

ABSTRACT: Metallic cryostats for optical and spectral studies at liquid hydrogen and liquid helium temperatures have been developed by the present authors and are briefly described in this paper. The cryostats are designed for work on the absorption and luminescence of crystals in free and stressed state as well as for photoelectric low temperature studies. Figs 2 and 3 show the hydrogen and helium cryostats respectively. The cryostat shown in Fig 2 loses 1 litre of hydrogen in 18-20 hours. The cryostat shown in Fig 3 loses 1 litre of hydrogen in 30 hours or 1 litre of helium in 5 hours. Various attachments and specimen holders used in conjunction with these cryostats are shown in Figs 4-7. One of the features of the cryostats is their vacuum sealed windows of the type shown in Fig 1. The present cryostats are modified forms of the cryostats described by the present authors in Refs 6 and 7.

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SOV/120-59-1-28/50

Methods and Apparatus for Low Temperature Optical and Spectral Studies.

There are 7 figures and 8 references, of which 4 are Soviet,
1 is French and the rest are English.

ASSOCIATION: Institut fiziki AN USSR (Institute of Physics of the
Academy of Sciences of the USSR)

SUBMITTED: January 3, 1958

Card 2/2

PRIKHOT'KO, A.F. [Prykhot'ko, A.F.]; SOLOV'YEV, A.V. [Soloviov, A.V.]

Absorption and luminescence of impurities in organic crystals at 20°K. Part 1: Spectra of naphthalene solutions in dibenzyl and diphenyl crystals [with summary in English]. Ukr. fiz. zhur. 4 no.1:92-107 Ja-F '59. (MIRA 12:6)

1. Institut fiziki AN USSR.

(Naphthalene--Spectra) (Dibenzyl crystals) (Diphenyl crystals)

PRYKHOT'KO, A.F. [Prykhot'ko, A.F.]; SOLOV'YEV, A.V. [Soloviov, A.V.]

Absorption and luminescence of impurities in organic compound crystals at 20° K. Part 2: Spectra of naphthalene solutions in the crystals of certain uncondensed aromatic hydrocarbons. Ukr. fiz. zhur. 4 no.2: 229-238 Mr-Ap '59. (MIRA 13:1)

1. Institut fiziki AN USSR.

(Naphthalene--Spectra) (Crystals)
(Hydrocarbons)

SOV/51-6-1-5/30

AUTHORS: Brodin, M.S., Priklad'ko, A.F. and Soskin, M.S.

TITLE: On Non-Validity of the Kramers--Kronig Dispersion Relationships in the Case of Molecular Crystals at Various Temperatures (O nesoblyudenii dispersionnykh sootnosheniy Kramersa--Kroniga v sluchaye molekulyarnykh kristallov pri razlichnykh temperaturakh)

PERIODICAL: Optika i Spektroskopiya, 1968, Vol. 6, No. 1, pp 26-32 (USSR)

ABSTRACT: Kramers--Kronig formulae (Ref 1) give the relationship between refractive indices and the absorption coefficients of a sample. They are derived from Maxwell's electromagnetic equations and should hold wherever Maxwell's theory holds. For some substances the Kramers--Kronig formulae were found to hold at room temperature (Refs 2, 3). The same substances when tested at low temperatures showed a disagreement between theory and experiment. The present paper describes an attempt at verification of these relationships in strongly absorbing molecular crystals of anthracene, 1,2-benzanthracene, stilbene and tolane which were studied at temperatures of 290, 80 and 20°K. The experimental data on absorption and dispersion of light in monocrystals of anthracene, stilbene and tolane were published earlier (Refs 5-7). The present paper gives the results obtained on 1,2-benzanthracene; these results

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are shown in Fig 1 (absorption spectrum at 20°K) and Fig 2 (dispersion curve at 20°K - curve 1 was obtained experimentally and curve 2 was calculated). To measure the absorption and dispersion, thin samples, cut from monocrystals, were used. The monocrystals themselves were produced by sublimation. Measurements were made in polarized light. The dispersion curves were obtained interferometrically, by means of a Jamin interferometer. The absorption curves were measured photometrically using photographic film and photoelectric multipliers. The results reproduce of from Refs 6-7 and those reported on 1,2-benzanthracene show that in some molecular crystals the Kramers--Kronig dispersion relationships may not be obeyed. The departure from these relationships is greatest at the lowest temperatures and it

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On Non-Validity of the Kramers--Kronig Dispersion Relationships in the Case of
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decreases with increase of temperature (about three times on increase of temperature from 20 to 280°K). The Kramers--Kronig formulae apply fully at room temperature in stilbene and tolane. On the other hand measurements on anthracene in light polarized parallel to the b-axis show that the Kramers--Kronig relationships are not obeyed even at room temperature. There are 2 figures and 10 references, 7 of which are Soviet, 3 English and 1 German.

SUBMITTED: March 29, 1958

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AUTHORS: Prikhod'ko, A.F. and Shpak, M.T.

SOV/51-6-1-26/30

TITLE: On the Origin of Certain Electron Transitions in Naphthalene Crystals
(O proiskhozhdenii nekotorykh elektronnykh perekhodov v kristallakh
naftalina)

PERIODICAL: Optika i Spektroekopiya, 1959, Vol 6, Nr 1, pp 119-120 (USSR)

ABSTRACT: Because of doubts about the purity of crystals in earlier work (Refs 2, 3) the authors re-investigated the spectra of naphthalene in order to check the origin of electron transitions in crystals. The authors used samples of naphthalene of various origins and purified by various methods: chemical, recrystallization from solution, sublimation and zone melting. It was found that the intensities of the absorption lines at 29941 and 31060 cm^{-1} varied considerably from sample to sample (the samples were monocrystalline, of 1 to 5 mm thickness). If the method of zone melting is used it is possible to obtain a rod of naphthalene from which layers of various purity can be cut. Such a rod was presented to the authors by V.I. Startsev and Yu.V. Naboykin. It was found that the 31060 cm^{-1} line was virtually absent in sample cut from the region of the rod with the highest purity. On the other hand samples of low purity, also cut from this rod, had a strong polarized absorption band at the latter, 31060 cm^{-1} .

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On the Origin of Certain Electron Transitions in Naphthalene Crystals

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only the absorption but also luminescence spectra were found to depend on the sample purity. The observed effects suggested presence of impurities in the crystals. This was confirmed by adding β -naphthol which increased the intensity of the 29941 cm^{-1} line. Addition of β -methylnaphthalene strengthened the 31060 cm^{-1} line. Irradiation of naphthalene crystals with a beam of neutrons showed the presence of sulphur compounds in it. This irradiation and verification of the presence of sulphur compounds was carried out together with V.A. Batalin in the laboratory of M.V. Pasechnik. It is possible that one of these sulphur compounds is responsible for the 33441 cm^{-1} line and all the other related weakly polarized absorption lines. There are 6 references, 4 of which are Soviet, 1 English and 1 mixed (Soviet and English).

SUBMITTED: May 29, 1958

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24(4), 24(2)

SOV/51-7-1-6/27

AUTHORS: Prikhod'ko, A.F. and Fugol', I.Ya.

TITLE: Luminescence of Stilbene Crystals at 20°K (Lyuminesentsiya kristallov stil'bena pri 20°K)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 1, pp 35-43 (USSR)

ABSTRACT: The authors studied luminescence and absorption of 0.5 μ -2 mm thick stilbene monocrystals prepared by sublimation or grown from melt. Luminescence was excited by means of wavelengths near 3100 Å from a mercury lamp SVDSH-1000. The luminescence spectra were obtained by photographic photometry. The absorption spectra were recorded using a hydrogen lamp and two quartz spectrographs of high and medium dispersion: Hilger E₁ and ISP-22. The iron spectrum was used for calibration. All spectra were recorded at 20°K and some of them were also recorded at 293°K (room temperature). The luminescence spectrum was found to range from 29200 cm⁻¹ to the visible region. At 293°K it consists of several wide bands which split into narrow bands at 20°K (these narrow bands will be called "lines"). The strongest luminescence lines are shown in Fig 2; their number and intensities vary from sample to sample (Fig 3). Some of the luminescence lines, such as those at 29142, 29035, 28902 cm⁻¹ and

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Luminescence of Stilbene Crystals at 20°K

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other weaker lines, coincide with certain absorption lines. The intensities, widths and polarizations of absorption lines also vary from sample to sample. In thick crystals (100-300 μ) a new series of absorption lines appears (Fig 4 shows the absorption spectrum of a stilbene crystal 150 μ thick). The absorption lines, the fundamental absorption edge and the luminescence lines of stilbene at 20°K are shown schematically in Fig 5. The luminescence and absorption spectra were found to be strongly affected by annealing at either the liquid-nitrogen temperature (77°K) or the sublimation temperature ($\sim 70^\circ\text{C}$). The results obtained show that luminescence of stilbene is closely related to structural defects such as vacancies, molecules between lattice sites, deformed molecules, etc., which are produced during crystal growth. This close relationship with the structural defects is deduced from the variation of the luminescence spectrum from sample to sample and the large number of closely spaced resonance lines which occur at the heads of luminescence series. Each of such lines is due

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to some structural defect which produces a local energy level close to the corresponding level of the perfect lattice. The strong effect of annealing is a further confirmation of the suggested relationship. Each structural defect serves both as an absorption centre and a luminescence centre. These centres are discussed in greater detail elsewhere (Ref 11). There are 6 figures, 2 tables and 11 references, 9 of which are Soviet, 1 English and 1 German.

SUBMITTED: September 15, 1958

Card 3/3

24(7), 24(2)

AUTHORS: Brodin, M.S. and Prikhot'ko, A.F.

LOC/51-7-1-26/27

TITLE: The Effect of Thickness of Anthracene Crystals on their Absorption Curves at 20°K (Vliyaniye tolshchiny kristallov antratsena na ikh krivyye pogloshcheniya pri temperature 20°K)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 1, pp 132-133 (USSR)

ABSTRACT: Plane-parallel monocrystalline layers of anthracene, prepared by sublimation, were used. They were deposited on quartz plates and their optical density was measured photoelectrically, using a photomultiplier. The absorption coefficients were calculated by means of the usual formula [Eq (1)] in which $\lg(I_0/I)$ is the measured optical density corrected for losses by reflection and d is the crystal thickness. Since the thicknesses of the crystals were comparable with wavelengths used, a formula which is more exact than Eq (1) should be employed which would allow for interference in thin films. The authors found, however, that due to strong absorption by anthracene the error due to the use of Eq (1) was small and could be neglected. At 20°K the authors measured $\lg(I_0/I)$ as a function of frequency of about 20 crystals with thicknesses between 0.15 and 0.40 μ . The absorption coefficient curves of these crystals were found to depend on their

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SOV/51-7-1-26/27

The Effect of Thickness of Anthracene Crystals on their Absorption Curves at 20°K

thicknesses. By way of illustration the authors show in a figure on p 133 the absorption curves of the β -component in the region 25000-27000 cm^{-1} for four crystals, 0.16, 0.21, 0.29 and 0.4 μ thick (curves 1, 2, 3, 4 respectively). The absorption curves obtained for the α -component of the spectrum showed a similar dependence on thickness. These results indicate a serious departure from the Lambert-Buger law and it is difficult to see the reason for this behaviour. The authors point out that this dependence on thickness was observed only at 20°K: the absorption curves measured at room temperature were found to be independent of thickness. The authors suggest that the reason for the low-temperature anomalies may lie in the fact that the exciton absorption formulae may not be valid at low temperatures. There are 1 figure and 7 references, 4 of which are Soviet and 3 English.

SUBMITTED: February 21, 1959

Card 2/2

AUTHORS: Brodin, M.S., Prihot'ko, A.F. and Soskin, M.S.

SOV/51-7-2-25/34

TITLE: On Certain Dispersion Anomalies of Strongly Absorbing Crystals (O nekotorykh osobennostyakh dispersii sil'no pogloshchayushchikh kristallov)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 2, pp 266-267 (USSR)

ABSTRACT: The authors showed earlier (Ref 1, 2) that certain molecular crystals, such as 1,2-benzanthracene and anthracene, do not obey the Kramers--Kronig dispersion relationships and that the degree of the departure from these relationships increases with lowering of temperature. The authors used a Jamin interferometer to obtain the dispersion curves throughout the region of the first electron-vibrational transition, with the exception of the wavelengths where maximum absorption occurred in strong bands, i.e. wavelengths at which anomalous dispersion took place. The present paper describes studies of these anomalous dispersion regions in thin crystals of 1,2-benzanthracene and anthracene. An arrow in Fig 1 shows the maximum of the first long-wavelength absorption band in the 8-component of the spectrum of 1,2-benzanthracene (0.25 μ thick) at 20°K. It is seen that the interference bands in the region of the arrow are apparently split into two and overlap, which is not predicted by the

Card 1/2

On Certain Dispersion Anomalies of Strongly Absorbing Crystals SOV/51-7-2-25/34

usual theory of anomalous dispersion. It is suggested that the observed effect is due to propagation of two identically polarized waves with unequal path differences. This dispersion peculiarity was not observed in 1,2-benzanthracene at room temperature (Fig 2). In the case of anthracene the splitting and overlapping of interference bands at the absorption maxima was observed both at low and at room temperatures. The two waves, which are not due to the usual birefringence, were recently predicted (Refs 5, 6) for the region of exciton absorption in crystals. The authors suggest that this may in fact explain the observed anomalies. If this interpretation is correct such anomalies should not be observed in impurity crystals. The latter conclusion is confirmed by a photograph of the interference system in the absorption region of anthracene molecules present in a crystal of dihydroanthracene (Fig 3); no anomalies are seen in that photograph. The authors point out that the observed anomalies occur only in the case when the Kramers--Kronig relationships are not obeyed. There are 3 figures and 6 references, 5 of which are Soviet and 1 English.

SUBMITTED: February 21, 1959

Card 2/2

24(2)

AUTHORS: Brude, V. L., Prikhot'ko, A. F., SOV/53-57-1-5/12
Rashba, E. I.

TITLE: Some Problems of the Luminescence of Crystals (Nekotoryye
voprosy lyuminesentsii kristallov)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 1, pp 99-117 (USSR)

ABSTRACT: The authors make a contribution to the research of non-equilibrium states of nonmetallic crystals by the publication of a carefully compiled survey of the research results concerning crystal luminescence, devoting special attention to the exciton mechanism (Ya. I. Frenkel')(Ref 1). The latter was found to be very suited for describing excited states of crystals, in which there is no photoconductivity. Problems like the excitation and extinction of luminescence are not dealt with because they and others have been discussed by L. V. Levshin (Ref 6) in a survey. The entire experimental material confirms that in the case of excitation within the range of eigenabsorption the luminescence spectrum does not depend on the wavelength of the exciting light. The article first gives a short survey of the luminescence of pure crystals, i.e. of such without structural defects and

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Some Problems of the Luminescence of Crystals

SOV/53-67-1-5/12

impurities. Table 1 gives data (ν , λ) for benzene, naphthalene, anthracene, naphthacene, hexamethyl benzene, hexaethyl benzene, and ψ -iso-cyanine for the longest-wave intensive bands of eigenabsorption (Refs 11-17). A more detailed account is given of the luminescence phenomena on crystals containing impurities. Among others, the investigations carried out by V. Ye. Lashkarev and Yu. M. Karkhanin (Refs 33,42) on semiconductor crystals (Cu_2O) concerning excitation as a result of energy transfer by electron-hole pairs are discussed, and numerous data are given in a table concerning spectra of impurity crystals. The data were obtained from publications by A. F. Prikhod'ko, M. T. Shpak, E. V. Shpol'skiy, L. A. Klimova, E. A. Girdzhiyanskaya and A. V. Solov'yev.

The next chapter contains data on the luminescence of crystals at low temperatures. Numerous crystals have particularly bright luminescence at low temperatures, which was in most cases found to be due to impurities. However, also so-called "pure" crystals (V. A. Arkhangel'skaya, P. P. Feofilov, Ref 56) occasionally show bright luminescence and have certain characteristic features in their spectra. The first investigations of molecule crystals at low temperatures were carried out

Card 2/3

Some Problems of the Luminescence of Crystals

SOV/53-67-1-5/12

by I. V. Obreimov, A. F. Prihot'ko, and K. Shaballas (Ref 57) (anthracene, 20° K); figure 2 shows this absorption- and luminescence spectrum, which was recorded by A. F. Prihot'ko and I. Ya. Fugol' (Ref 65). Figure 1 in a similar manner shows the absorption line spectrum and the "blue" luminescence spectrum of one and the same CdS crystal at 20° K. A large number of molecule- and semiconductor crystals has already been investigated at low temperatures; the results obtained by these investigations are discussed in short. Finally, the quasiequilibrium distribution in the excited state is discussed which was investigated on the basis of the example of the optical and photoelectric properties of CdS crystals by numerous authors (Rashba, Broude, Yeremenko, N. N. Chikovani etc.) There are 2 figures, 2 tables, and 75 references, 53 of which are Soviet.

Card 3/3

BRODIN, M.S.; PRIKHOT'KO, A.F. [Prykhot'ko, A.F.]; SOSKIN, M.S.

Optical properties of crystals. Part 1. Ukr. fiz. zhur. 5 no. 6: 725-743 N-D '60.
(MIRA 14:3)

1. Institut fiziki AN USSR.
(Crystals--Optical properties)

BROUDE, V. L.; PRIHOTKO, A. F. [Prihot'ko, A. F.]; RASBA, E. I. [Rashba, Ye.I.]

Some problems of crystal luminiscence. Tr. from the Russian. Analele
mat 15 no.4:85-104 O-D '61.

(Crystals) (Luminiscence)

9.2576 (9/86 4205)

44258

S/181/62/004/010/055/063
B102/B104

AUTHORS: Broude, V. L., Mashkevich, V. S., Prikhot'ko, A. F.,
Prokopyuk, N. F. and Soskin, M. S.

TITLE: Possibility of obtaining induced radiation in systems with
electron vibrational levels

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2976-2978

TEXT: A possibility of obtaining negative temperatures and induced radiation in a four-level scheme of molecular systems is discussed. The scheme (Figure) consists of the ground state (1), a vibrational level of the electron ground state (2), the first excited electron level (3), and the totality of all higher levels (4). 1-4 is a transition due to light-quantum absorption, 4-3 a radiationless transition, 3-2 the transition used for obtaining the induced radiation and 2-1 again a radiationless transition. The lifetimes of the radiative transitions are

$\tau_r \sim 10^{-7} - 10^{-9}$ sec, those of the radiationless transitions are $\tau_n \ll \tau_r$.

τ_n has to be small for obtaining the induced radiation. Generation of
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Possibility of obtaining induced ...

S/181/62/004/010/055/063
B102/B104

coherent induced radiation begins if $n_3 - n_2 \geq 8\pi^2 c \tilde{\nu}^2 \Delta \tilde{\nu} \tau_o \frac{1-R}{l}$ where n_2, n_3 are the mean numbers of molecules in state 2 or 3 per unit volume, $\tilde{\nu}$ is the wave number of the 3-2 transition, $\Delta \tilde{\nu}$ the halfwidth, R the reflection coefficient of the resonator mirror, l is the length of the sample, and τ_o is the lifetime of state 3 with respect to the 3-2 transition.

$n_3 \approx 47 K_1 N$, where τ is the lifetime of state 3 with respect to all other transitions to lower states, K is the mean absorption coefficient on the region of the 1-4 transition, η is the number of states 3 produced from one state 4, and N is the number of photons of the optical excitation 1-4 per unit of time and per unit of surface area. Numerical estimates for the anthracene molecule are presented. For $K=2 \text{ cm}^{-1}$, $\eta = 1$, $\tau = 3 \cdot 10^{-8} \text{ sec}$ and $\tau_o = 10^{-7} \text{ sec}$ one obtains $N = 4 \cdot 10^{21} \text{ cm}^{-2} \text{ sec}^{-1}$ which can be realized by means of an ИФК-2000 (IFK-2000) pulsed lamp. If besides $\tau_n \ll \tau_r$, $n_2 \ll n_3$, N will depend on τ_o/τ , not on τ alone. This makes it possible to draw conclusions as to the most effective form of luminescence spectrum to obtain induced radiation. A system of layers of dielectric

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B102/B104

coatings with a certain $R(\omega)$ dependence allows of annihilating all induced radiation frequencies other than a chosen one, where R has a peak. Thus such a system can be used as an "antifilter". There is 1 figure. The most important English-language references are: W. Kaiser et al. Phys. Rev., 123, 765, 1961; E. G. Brock et al. J. Chem. Phys. 35, 759, 1961.

ASSOCIATION: Institut fiziki AN USSR, Kiyev (Institute of Physics
AS UkrSSR, Kiyev)

SUBMITTED: June 6, 1962

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Possibility of obtaining induced ...

S/181/62/004/010/055/063
B102/B104

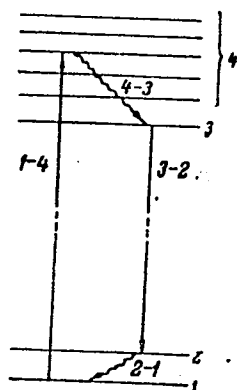


Fig.

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PRIKHOT'KO, A.F.; SOSKIN, M.S.

Shapes of the main absorption bands for naphthalene crystals
at 20°-290°K. Opt. i spektr. 13 no.4:522-531 0 '62.

(Naphthalene crystals--Spectra) (MIRA 16:3)

BAYSA, D.F.; PRIKHOT'KO, A.F. [Prykhot'ko, A.F.]

Temperature dependence of the frequency of nuclear quadrupole
resonance of Cl^{35} and Cu^{63} in certain compounds. Ukr. fiz. zhur.
9 no.5:573-575 My '64. (MIRA 17:9)

1. Institut fiziki AN UkrSSR, Kiev.

PRIKHOT'KO, A.F.; PTUKHA, T.P.; SHANSKIY, L.I.

Low-temperature methods for magneto-optical studies of crystals
in the temperature region of superfluid helium. Zhur. prikl.
spekt. 2 no.3:223-226 Mr '65. (MIRA 18:6)

L 15005-66

EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/WW/GG

ACC NR: AP6001644

SOURCE CODE: UR/0051/65/019/006/0916/0922

AUTHOR: Prikhot'ko, A. F.; Pakhomova, O. S.

ORG: none

82
B

TITLE: ^{21,44,55} Absorption of light by alpha-oxygen in the 34,000-41,000 cm⁻¹ region at 4°K

SOURCE: Optika i spektroskopiya, v. 19, no. 6, 1965, 916-922

TOPIC TAGS: absorption spectrum, oxygen, cryogenics, molecular physics, LIGHT
ABSORPTION

ABSTRACT: The absorption spectra of crystalline ²¹oxygen were photographed by using layers of condensate produced by cooling a stream of gas on a collector which was cooled by liquid helium. The collector was a flat quartz window and the cooled layer was located in the vacuum chamber of a cryostat. Quartz spectrographs with low dispersion were used. The light source was a krypton lamp. A comparison of crystal spectra showed that most of the absorption in the 34,000-41,000 cm⁻¹ region is due to excitation of molecules to the ³ Σ_u^+ state. A transition which is forbidden in the free molecule appears in the spectra of condensed phases as a forced dipole transition. The vibrational levels in the spectra of the crystal and gas are tabulated

Card 1/2

UDC: 535.3473 : 546.21

L 15005-66

ACC NR: AP6001644

and the positions of the pure electron transitions are calculated. The greatest differences between the crystal and gas spectra are in the fine structure of the members of the principal and subordinate series. Each electron-vibrational gas absorption line in the crystal shows a triplet of narrow lines accompanied by satellites. The absorption intensity in the ${}^3\Sigma_g^- \rightarrow {}^3\Sigma_u^+$ transition of the O_2 molecule is extremely low in the gas at normal pressure and is linearly pressure-dependent at low pressures; in the compressed gas, the absorption intensity increases as the square of the pressure; in the crystal, the absorption intensity is extremely high--equivalent absorption layers of gaseous oxygen at normal pressure and crystalline oxygen differ by a factor of 5,000. The mechanism responsible for these phenomena is exchange interaction which is extremely active due to the participation of molecules in the ${}^3\Sigma_u^+$ state. Orig. art. has: 3 figures, 2 tables.

SUB CODE:0720/ SUBM DATE: 03Aug64/ ORIG REF: 000/ OTH REF: 006

OC
Card 2/2

VATULEV, V.N. [Vatuli'ov, V.M.]; PRYKHOT'KO, A.F. [Prykhot'ko, A.F.]

Optical and spectral studies of polymorphous transformations in
octahydroanthracene crystals. Ukr. fiz. zhur. 10 no.7:763-771
Jl '65. (MIRA 18:8)

1. Institut fiziki AN UkrSSR, Kiev.

L 58955-65 EED(b)-3/EPF(c)/EPF(n)-2/ENT(1)/ENT(m)/ENP(b)/ENP(t) Pr-h/Pu-l
IJP(c) WW/JD
ACCESSION NR: AP5010387 UR/0368/65/002/003/0223/0226
536.61

34
33
B

AUTHORS: Prikhot'ko, A. F.; Ptukha, T. P.; Shanskiy, L. I.

TITLE: Low temperature²¹ procedure for magneto-optical investigations of crystals superfluid helium²⁷ temperatures

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 3, 1965, 223-226

TOPIC TAGS: superfluidity, low temperature research, magneto-optical measurements, cryostat design

ABSTRACT: ^{qm} The purpose of the investigation was to develop a low-temperature procedure for magneto-optical investigations of crystals in the temperature interval down to 1.2K. The cryostat used for the measurements is shown in Fig. 1 of the Enclosure. Earlier cryostats were suitable for operation down to 4.2K only, and were not equipped to cope with the superfluidity which sets in below the λ transition point (2.17K). An operating procedure for the use of the cryostat is described. The procedure was used to investigate the absorption spec-

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L 58955-65

ACCESSION NR: AP5010387

trum of solid oxygen and of antiferromagnetic crystals. It is pointed out that the construction of the cryostat is such that the spectra can be recorded by various standard optical means. 'We thank A. B. Fradkov for valuable help in the work.' Original article has: 1 figure

ASSOCIATION: None

SUBMITTED: 10Nov64

ENCL: 01

SUB CODE: GP

NR REF SOV: 003

OTHER: 003

Card 2/3

L 58955-65

ACCESSION NR: AP5010387

ENCLOSURE: 01

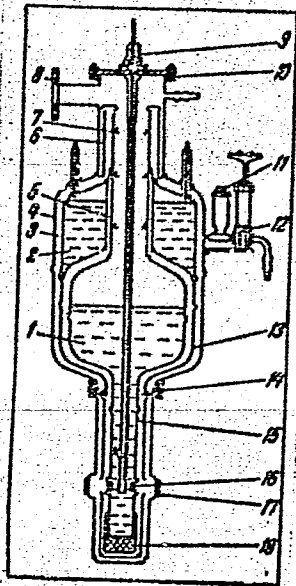


Fig. 1. Cryostat for magneto-optical investigations of crystals in the region of superfluid helium temperatures.

- 1 - Tank, 2 - nitrogen bath, 3 - vacuum cavity, 4 - cover, 5 - thin wall tube, 6 - thin wall tube, 7 - stiffener, 8 - vacuum line, 9 - sleeve, 10 - flange, 11 - ionization manometer, 12 - bellows valve, 13 - copper screen, 14 - teflon gasket, 15 - tube, 16 - window, 17 - window, 18 - carbon pump

Card 3/3

PELKHOT'KO, A.F. [Pykhot'ko, A.F.]; SHVACHKOVA, A.F. [Shvachat'ko, A.F.]

Spectral study of pentacene. Ukr. fiz. zhur. 10 no. 3:354-358 1965. (Ukr. 13:6)

1. Institut fiziki AN UkrSSR, Kiev.

BROUDE, V. A., MASHKEVICH, V. S., PRIKHOT'KO, A. F., PROKOPIYUK, M. F., SOSENIN, M. S.

"Induced radiation in molecular crystals."

A four-level scheme for a quantum generator was discussed. It was shown that optical properties of molecular crystals provide a basis for the realization of a quantum generator.

The report presented to the 11th Conference on Luminescence (Molecular luminescence and luminescence analysis) Minsk, 10-15 Sept. 1962.

PRIKHOT'KO, A.F.; SOSKIN, M.S.; TOMASHCHIK, A.K.

Measurement of the absorption spectra slender deformed
naphthalene crystals. Opt. i spektr. 16 no. 4:615-618
Ap '64. (MIRA 17:5)

L 24915-65 EWT(1)/EWT(m)/EPF(c)/LWP(j)/T/EEG(b)-2 Pc-4/Pr-4 IJP(c) RM
ACCESSION NR: AP5003411

S/0181/65/007/001/0042/0045

AUTHORS: Vatulev, V. N.; Prikhot'ko, A. F.

TITLE: Polymorphic transformation of the martensitic type in crystals of octahydroanthracene 45

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 42-45

TOPIC TAGS: polymorphic transformation, martensitic transformation, anthracene, organic crystal, double refraction, absorption spectrum

ABSTRACT: Two manifestations of the polymorphic transformation of octahydroanthracene crystals were investigated. One consists in the abrupt change in birefringence observed in thin-crystal plates of the material grown from a melt between the plates of a quartz cuvette, and cooled from the crystallization temperature (65C), and also in a freely grown bulk sample. The other manifestation is a change in the absorption spectrum which can be attributed only to

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L 24915-65

ACCESSION NR: AP5003411

the polymorphic realignment of the crystal lattice. Some details of the polymorphic transformation, which are still difficult to interpret at the present time, are discussed. The reasons for classifying such a transformation as martensitic are briefly mentioned. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki AN UkrSSR, Kiev (Institute of Physics, AN UkrSSR)

SUBMITTED: 13Jun64

ENCL: 00

SUB CODE: SS, OP

NR REF SOV: 002

OTHER: 000

Card

2/2

L 52775-65 EWT(1)/EWP(e)/EWT(m)/EPF(c)/EWP(i)/EWP(j)/T/EEC(b)-2/EWP(b)
 P8-4/Pq-4/Pr-4/Pi-4 IJP(c) GG/RM/WH

ACCESSION NR: AP5010754

UR/0181/65/007/004/1259/1261

AUTHOR: Prikhot'ko, A. F.; Skorobogat'ko, A. F.

TITLE: Phase transformation in naphthacene single crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 4, 1985, 1259-1261

TOPIC TAGS: naphthacene, single crystal, phase transformation, first order phase transformation, aromatic compound, exciton splitting

ABSTRACT: The reason for the investigation was that other members of the multi-ring aromatic series of compounds (naphthalene, phenanthrene, anthracene) do not become unstable at low temperatures, but naphthacene does. Crystals 0.1--2 μ thick were obtained by sublimating naphthacene in an inert gas atmosphere and cooling to 20K. An abrupt change in the spectrum of the crystal is observed when cooled below 70K. The exciton splitting of the Q-Q band increased from 700 to 940 cm^{-1} , and a new band appeared in the component. This indicates that a phase transition takes place in the crystal with a transition point at 70K. The transition to the low-temperature modification is accompanied by a change in the volume of the cell, causing some of the crystals to be destroyed. No phase transition was observed if

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L 52775-65

ACCESSION NR: AP5010754

the crystal was placed in optical contact with quartz (the other crystals were "freely" held in paper envelopes). It is concluded from the large value of the exciton splitting that the transition is of first order, and that the weakly triclinic lattice is replaced by monoclinic, which is inherent of all initial terms of the multi-ring aromatic series. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki AN UkrSSR, Kiev (Physics Institute AN UkrSSR)

SUBMITTED: 19Aug64

ENCL: 00

SUB CODE: SS, OF

NR REF SOV: 006

OTHER: 000

Card 2/2

PRIKHOT'KO, G.F., kandidat geograficheskikh nauk

Vertical air currents in fogs. Meteor. i gidrol. no.3:45-46
Mr '53. (MIRA 8:9)

1. Gosudarstvennyy universitet, Kiyev.
(Fog) (Atmosphere)

PRIKHOT'KO, G.F.

One hundredth anniversary of the founding of the Kiev Geophysical
Observatory. Meteor. i gidrol. no.2:58-59 F '56. (MLRA 9:6)
(Kiev--Geophysics)

PRIKHOT'KO, G.F.

The 100th anniversary of the Ukrainian Hydrometeorological Institute
for Scientific Research (The Geophysical Observatory). *Trudy Ukr.*
NIGMI no.5:5-14 '56. (MIRA 10:9)

(Ukraine--Meteorology)

PRIKHOT'KO, G.F.

Data on the duration, intensity, and period of different types
of precipitation in Ukraine. Trudy Ukr.NIGMI no.6:161-166
'56. (MLRA 10:5)
(Ukraine--Precipitation)

PRIKHOT'KO, G.F.; PROKH, L.Z.

Fumuli over Kiev on August 17, 1955. Trudy Ukr.NIGMI no.7:81-99
'57. (MIRA 11:4)
(Kiev--Clouds)

GUK, N.I.[Huk, M.I.], POLOVKO, I.K.,[Polovko, I.K.], PRIKHOT'KO, G.F.,
[Prykhot'ko, H.F.],; KIR'YAKOV, Yu. F.,[Kir'yakov, IŮ. F.], red.;
GORBUNOVA, N.M., tekhn. red.

[Climate of the Ukraine; a brief account] Klimat Ukraini'koi RSR;
korotkyi narys. Kyiv, Derzh. uchbovo-pedagog. vyd-vo
"Radiants'ka shkola," 1958. 69 p. (MIRA 11:11)
(Ukraine--Climate)

PRUKHOT'KO, KH F

3(7)

PHASE I BOOK EXPLOITATION

SOV/1797

Huk, M.I., I.K. Polovko, and H.P. Prukhot'ko

Klimat Ukrainy'koi. RSR; korotkyy narys (Climate of the Ukraine: a brief account) Kiev, Derzh. uchbovo-pedagog. vyd-vo "Radyans'ka shkola," 1958. 69 p. 5,200 copies printed.

Ed.: Yu. F. Kir'yakov; Tech. Ed.: N.M. Gorbunova

PURPOSE: This booklet is intended for the general reader interested in the Ukraine.

COVERAGE: The booklet gives a brief summary, in layman's language, of the climate and climate-forming agents of the Ukrainian SSR. Table, maps, and photos are included in the text. It is written in Ukrainian. No personalities are mentioned. There are 11 references of which 9 are Soviet, 1 German, and 1 Polish.

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* Climate of the Ukraine (Cont.)

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AVAILABLE: Library of Congress (QC989.R5L145)

MM/gmp
6-4-59

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Prikhot'ko G.F.
3(7)

PHASE I BOOK EXPLOITATION

SOV/2384

Konferentsiya po agrometeorologii i agroklimatologii Ukrainiskoy SSR

Materialy konferentsii (Material of the Conference on Agricultural Meteorology and Climatology of the Ukrainian SSR) Leningrad, Gidrometeoizdat, 1958. 247 p. Errata slip inserted. 700 copies printed.

Sponsoring Agencies: USSR. Glavnoye upravleniy gidrometeorologicheskoy sluzhby, Ukrainian SSR. Ministerstvo sel'skogo khozyaystva, Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskii institut, and Ukrainskaya akademiya sel'skokhozyaystvennykh nauk.

Resp. Ed.: G.F. Prikhod'ko; Ed.: V.D. Piskoarskaya; Tech. Ed.: M.I. Braynina.

PURPOSE: This book is intended for agriculturists, agrometeorologists, and instructors in related vuzes.

COVERAGE: This collection of articles deals with problems in agricultural meteorology in the Ukraine. Among the topics discussed

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Material of the Conference (Cont.)

SOV/2384

are: wintering, planting time for winter crops, corn cultivation, potato degeneration, moisture supply, and adverse weather factors. References accompany individual articles.

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230

A suggestion of the Scientific Methodology Council of the UkrSSR
Department of Agriculture

243

AVAILABLE: Library of Congress

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MM/bg
9-22-59

3.5000

SOV/169-59-5-4974

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 5, pp 94 - 95
(USSR)

AUTHOR: Prikhot'ko, G.F.

TITLE: The Connection Between the Low Cloudiness and the Meteorologic ^{12/}
Phenomena ✓

PERIODICAL: Tr. Ukr. n.-i. gidrometeorol. in-ta, 1958, Nr 12, pp 3 - 15

ABSTRACT: On the basis of the data of five stations (L'vov, Kiyev, Khar'kov, Odessa, Stalino), the connection between the low cloudiness, the visibility, the temperature of air, the humidity, and the wind at the surface of earth, is determined for the warm and the cold periods of year. In the case of low cloudiness (0 - 300 m of height) the visibility is better in summer than in winter. But also in winter, the visibility is rather good if the low cloudiness is not accompanied with other phenomena (drifting snow, precipitations). The temperature of the air at the surface of earth is connected directly with the altitude and the thickness of the cloudy layer. In the case of smaller thickness of the cloud layer ✓

Card 1/3

SOV/169-59-5-4974

The Connection Between the Low Cloudiness and the Meteorologic Phenomena

(airmass clouds), lower temperatures are observed than in the case of larger thickness (frontal clouds). In winter, in the case of frontal cloudiness the temperature is mostly observed within limits of $\pm 4.9^{\circ}\text{C}$, and in the case of air-mass clouds the temperature is considerably lower (down to -9.9°C). In summer in the case of frontal cloudiness, predominate high temperatures (15°C , $0 - 19.9^{\circ}\text{C}$). Local characteristics of relief affect the course of temperature changes. The specific and the relative humidities are lower for low air-mass cloudiness than for frontal cloudiness. In winter, from November to April, the specific humidity for frontal cloudiness is observed mostly (in 56 - 63% of all cases) within the limits of 3.1 - 5.0 g/kg. For air-mass cloudiness, there is no such clearness. In summer, high specific humidity (higher than 7.0 g/kg) can be observed for both types of cloudiness. The relative humidity is high for low cloudiness, but for cloudiness higher than 300 m, the humidity can be different. The velocity of wind amounts to 4 - 6 m/sec on the yearly average for low cloudiness. Velocities of wind lower than 2 m/sec and higher than 14 m/sec can be observed rarely. For frontal cloudiness, the velocity of wind is somewhat higher. The direction of wind differs from the mean wind

Card 2/3

SOV/169-59-5-4974

The Connection Between the Low Cloudiness and the Meteorologic Phenomena
rose plotted independently of the weather conditions. An effect of the
local conditions on the direction of wind is noted. In the warm half of
the year, calm frequently can be observed at air-mass cloudiness.

A.Z. Chekirda

✓

Card 3/3

SOV/169-59-5-5082

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 5, pp 110 - 111
(USSR)

AUTHOR: Prikhot'ko, G.F.

TITLE: The Connection Between Low Cloudiness and Synoptic Processes in
the Ukraine

PERIODICAL: Tr. Ukr. n.-i. gidrometeorol. in-ta, 1958, Nr 12, pp 16 - 20

ABSTRACT: The cases of formation of low cloudiness^{iv} in heights of up to 600 m were analyzed at 5 stations in the Ukraine during a five-year period. As a result it was determined that the overwhelming majority of cases represents a frontal cloudiness. The fraction of cases of air-mass cloudiness is, on the average, somewhat larger than 1/3. The predominance of frontal cloudiness is particularly large in the period of warm half year. In the cold period of the year, the warm fronts are accompanied particularly often with low cloudiness, 86%, and the role of the cold and the quasi-stationary fronts is approximately the same in both of halves of the year. The comparison of the number of cases of

Card 1/2

30V/169-59-5-5082

The Connection Between Low Cloudiness and Synoptic Processes in the Ukraine

formation of low cloudiness with the number of cases where cloudiness is absent with the same synoptic processes, shows that every second front during a year on the average is accompanied with low cloudiness, and in this case the formation of front cloudiness amounts to 59% in winter and 34% in summer. On the contrary, the situations typical for the air-mass cloudiness are accompanied with it merely in 29% of the cases in winter and 14% in summer.

L.V. Klimenko

Card 2/2

PRIKHOT'KO, G.F.

Some characteristics of low clouds in the Ukraine. Trudy UkrNIGMI
no.13:87-96 ' 58. (MIRA 11:12)
(Ukraine--Clouds)

FALEET, G.I.; PRIKHOT'KO, G.F.

Some problems in the theory of artificial precipitation of stratus
and stratocumulus clouds. Trudy UkrNIIGMI no.17:3-15 '59.

(Weather control)

(MIRA 13:12)

BABICHENKO, V.N.; GUK, N.I.; GOYSA, N.I.; PRIKHOT'KO, G.F.; PROKH, L.Z.;
ROZOVA, Ye.S.

Meteorological observations in the Ukraine during the period July
1957-June 1958. Mezhdunar. geofiz. god [Kiev] no.2:130-140 '60.
(MIRA 14:1)

1. Ukrainian Research Institute for Hydrometeorology.
(Ukraine--Meteorology--Observations)

BONDARCHUK, V.G., akademik, otv. red.; KOROLEVA, M.A., glav. red.;
 KOCHUBEY, A.D., red.; RADUL, M.M., kand. geogr. nauk, red.;
 BILYK, G.I., kand. biol. nauk, red.; GEYDEMAN, T.S., kand.
 biol. nauk, red.; ZAMORIY, P.K., doktor geol.-min. nauk, prof.,
 red.; KUGUKALO, I.A., kand. ekon. nauk, starshiy nauchnyy sotr.,
 red.; MARINICH, A.M., dotsent, red.; MUKOMEL', I.F., kand. geogr.
 nauk, starshiy nauchnyy sotr., red.; PRIKHOT'KO, G.F., kand.
 geogr. nauk, red.; ROMANENKO, I.N., akademik, red.; TAL'NOVA,
 N.N., red.; BYUSHGENS, L.M., kand. geogr. nauk, retsenzent;
 DIDKOVSKIY, I.Ya., kand. geol.-miner. nauk, retsenzent;
 KEL'NER, Yu.G., kand. geogr. nauk, retsenzent; NADEZHIN, P.F.,
 retsenzent; NIKISHOV, M.I., doktor tekhn. nauk, retsenzent;
 PIDOPLICHKO, I.G., retsenzent; KURDINA, G.P., red.-kartograf;
 RACHINSKAYA, Z.P., red.-kartograf; SLEPTSOVA, L.M., redaktor-
 kartograf.

[Atlas of the Ukrainian S.S.R. and the Moldavian S.S.R.] Atlas
 Ukrainskoi SSR i Moldavskoi SSR. Moskva, 1962. vi p. 90 p.
 of col.maps. (MIRA 15:5)

(Continued on next card)

BONDARCHUK, V.G.— (continued) Card 2.

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye geodezii i kartografii.
2. Akademiya nauk USSR, direktor Instituta geologicheskikh nauk Akademii nauk USSR (for Bondarchuk).
3. Nachal'nik kartosostavitel'skogo tsekha fabрики No.1 (for Koroleva).
4. Zamestitel' predsedatelya Gosudarstvennogo planovogo komiteta Soveta Ministrov USSR (for Kochubey).
5. Direktor Instituta ekonomiki Akademii nauk Moldavskoy SSR (for Radul).
6. Zamestitel' direktora po nauchnoy rabote Instituta botaniki Akademii nauk USSR (for Bilyk).
7. Direktor Botanicheskogo sada Akademii nauk Moldavskoy SSR (for Geydeman).
8. Zaveduyushchiy kafedroy geomorfologii Kiyevskogo gosudarstvennogo universiteta (for Zamoriy).
9. Institut ekonomiki Akademii nauk USSR (for Kugukalo).
10. Zaveduyushchiy kafedroy fizicheskoy geografii Kiyevskogo gosudarstvennogo universiteta (for Marinich).
11. Ukrainskiy nauchno-issledovatel'skiy institut ekonomiki i organizatsii sel'skogo khozyaystva (for Mukomel').
12. Direktor Ukrainskogo nauchno-issledovatel'skogo gidrometeorologicheskogo instituta (for Prihot'ko).

(Continued on next card)

BONDARCHUK, V.G.---(continued) Card 3.

13. Direktor Ukrainskogo nauchno-issledovatel'skogo instituta ekonomiki i organizatsii sel'skogo khozyaystva, Chlen-korrespondent Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Romanenko). 14. Direktor fabriki No.1 (for Tal'nova). 15. Chlen-korrespondent Akademii nauk USSR (for Pidoplichko).

(Ukraine--Maps)

(Moldavia--Maps)

PRIKHOT'KO, G. [Prykhot'ko, H.], kand.geograf.nauk

Bridled clouds. Nauka i zhyttia 12 no.11:23-24 N '62.

(MIRA 16:1)

1. Direktor Ukrainського nauchno-issledovatel'skogo gidrometeorologicheskogo instituta.

(Weather control)

L 12458-65 EWT(1)/EWT(m)/FCC P1-4 GW
ACCESSION NR: AP4047801

S/0050/64/000/011/0027/0029

AUTHOR: Prikhot'ko, G. F. (Candidate of geographical sciences); Royev, L. M. (Candidate of physicomathematical sciences); Tovbin, M. V. (Doctor of chemical sciences, Professor)

TITLE: Use of monomolecular films in combatting evaporation-type fogs 3

SOURCE: Meteorologiya i gidrologiya, no. 11, 1964, 27-29

TOPIC TAGS: fog, evaporation fog, fog dispersion, weather control, surface active film, hexadecanol ✓

ABSTRACT: A study was conducted of the effect of monomolecular films on the rate of evaporation of water at low temperatures (0 and 20C) to devise a method of combatting evaporation-type fogs by using surface-active reagents to reduce the rate of evaporation from the surface of a body of water. It was found that the efficiency of hexadecanol film in reducing evaporation is greater at low temperatures than at high temperatures. It is estimated that 500—1000 kg of the reagent would be required to disperse fog in the port of Murmansk.

Card 1/2

L 12458-55

ACCESSION NR: AP4047801

Orig. art. has: 2 tables and 6 formulas.

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskii institut (Ukrainian Scientific Research Hydrometeorological Institute)

SUBMITTED: 07Feb64

ENCL: 00

SUB CODE: ES

NO REF SOV: 002

OTHER: 000

ATD PRESS: 3125

Card 2/2

L 10743-66 EWT(1)/FCC
ACCESSION NR: AP5023682

UR/0050/65/000/010/0036/0038
UDK.551.509.617

AUTHOR: Prikhot'ko, G.P.

TITLE: Approximate criterion defining the expectation of artificial rain production from cumulus clouds in the Ukr. SSR

SOURCE: Meteorologiya i gidrologiya, no. 10, 1965, 36-38

TOPIC TAGS: cloud formation, rain, atmospheric precipitation

ABSTRACT: The outcomes of cloud seeding experiments were analysed to develop empirically based criteria for the prediction of artificial rain production prospects. 94 preliminary, CO₂-seeding experiments were initially analysed to develop 5 - parameter space cells containing all only positive responses to seeding and all only negative ones. The following cloud parameter limits always resulted in a positive response: a) air temperature at seeding level - under -12.1C; b) internal height - over 3.6 km; c) supercooled internal height, - over 2.2km. d) volume, - over 21 km³ and e) supercooled volume, - over 16 km³. Negative response always re-

Card 1/3

L 10743-66

ACCESSION NR: AP5023682

sulted with parameter limits: a) - over $-4C$; b) -under 2.1 km; c) under .6 km; d)- under 4.5 km^3 ; e) - under 1.4 km^3 . A substantial uncertainty region remained, w... 5 parameters for estimation. A second study was made to arrive at only two pertinent easily observable parameters. The cloud internal height (ΔH) and the cloud temperature at the 200 m. under-the-top seeding level were chosen and 323 seedings analyzed. The results are shown in ENCL. 01. Here, empty circles mean no response, triangles denote rain formation unable to reach the ground, and solid dots - successful rainmaking. Criterion boundaries mark off the zones denoted I, II, III, and IV in the two-parameter space (area), meaning: 100% rainmaking success, 50% success, 10% success and (IV) - no response. The graph can be used as a practical criterion for cloud seeding work. The group criteria can also be used for cumulus cloud classification. Orig. art. has: 1 figure, 1 table.

ASSOCIATION: Ukrainskiy Nauchno-Issledovatel'skiy gidrometeorologicheskiy Institut
(Ukrainian hydrometeorological scientific research Institute)

SUBMITTED: 10Mar65

ENCL.: 01

44.55
SUB CODE: 08

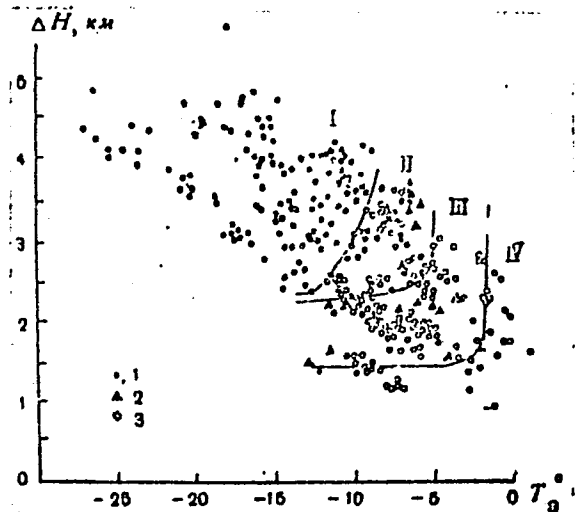
NO REF SOV: 003

OTHER: 004

Card 2/3

L 10743-66
ACCESSION NR: AP5023682

ENCLOSURE: 01



LEGEND:

ΔH : Internal cloud height, km
 T_3 : Cloud temperature at the seeding level, $^{\circ}\text{C}$.

- 1 - Precipitation formed and reached the ground.
- 2 - Weak precipitation unable to reach the ground.
- 3 - Clouds yielded no precipitation.

Fig. 1. Graph of the criterion H/T_3

Card 3/3 *pu*

ACC NR: AP7002143

SOURCE CODE: UR/0050/66/000/012/0053/0054

AUTHOR: Prikhod'ko, G. F. (Doctor of geographical sciences) (deceased)

ORG: Ukrainian Scientific Research Hydrometeorological Institute (Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskii institut)

TITLE: The possibility of using aerial photography for the study of convection clouds

SOURCE: Meteorologiya i gidrologiya, no. 12, 1966, 53-54

TOPIC TAGS: stereoscopic photography, aerial photography, atmospheric cloud, cloud cover, cloud formation, airplane / IL 14, airplane

ABSTRACT: Stereoscopic aerial photography can be profitably used for studying convection clouds. The photographs provide information on the altitude of the cloud base and top, its thickness, volume, and extent. In the summer of 1962 an IL-28 airplane made stereoscopic photographs of cumulus clouds from a height of 10 km. The studies showed that the cloud base was at 1000 m above the surface, and the volume and number of clouds were computed, showing that the clouds occupied 10% of the air volume up to the cloud top and covered 68% of the ground surface. At 10 km a camera with a 55-cm focal length scans a path 30 km wide along the surface, so that clouds at a height of 5 km are photographed in a 15-km wide band. The best photographic height is 15-20 km. For maximum stereoscopic effect the picture overlap

Card 1/2

UDC: 551.501.776

ACC NR: AP7002143

should be 66%. The error in cloud height determinations is less than 200-300 m, and the error in the volume determination is less than 5-10%. The measurement of the cloud base and top can be refined by using an IL-14 airplane flying through the cloud base and top. Orig. art. has: 1 figure.

SUB CODE: 04/ SUBM DATE: 16Mar66

Card 2/2

I. 35968-66 FCC

ACC NR: AP6027387

SOURCE CODE: HU/0033/65/069/006/0332/0342

AUTHOR: Prikhot'ko, Gennadiy Fedorovich (Doctor of geographical sciences; Director; Kiev)

ORG: UkrNIGMI, Kiev

TITLE: Possibilities of inducing precipitation artificially from cumulus clouds 12
[This paper was presented at the Symposium on Cloud Physics held in Budapest from 8 to 10 September 1965.]

SOURCE: Idojaras, v. 69, no. 6, 1965, 332-342

TOPIC TAGS: atmospheric cloud, atmospheric precipitation, ice, crystal growth

ABSTRACT: The temperature ranges and ice-nucleus concentrations required for the formation of solid cloud elements were investigated. It was shown that in cumulus clouds precipitation forms through the Bergeron process, involving the growth of the ice crystals at the expense of water droplets. Seeding experiments with ice crystals, conducted in the Ukraine, were described. The cumulus clouds were classified according to types and the types more likely to yield to such seeding were described. The results of the seeding experiments were described and discussed. Orig. art. has: 2 figures and 2 tables. [JPRS: 34,270]

SUB CODE: 04, 20 / SUBM DATE: 08Sep65 / ORIG REF: 025 / OTH REF: 022

Card 1/1

ACC NR: AP7013731

SOURCE CODE: UR/0050/66/000/002/0056/0056

AUTHOR: none

ORG: none

TITLE: Gennadiy Fedorovich Prikhod'ko -- 1913-1965

SOURCE: Meteorologiya i gidrologiya, no. 2, 1966, 56

TOPIC TAGS: meteorologic personnel, atmospheric cloud, fog,
meteorologic research facility

SUB CODE: 04

ABSTRACT: Doctor of Geographical Sciences Gennadiy Fedorovich Prikhod'ko, Director of the Ukrainian Hydrometeorological Scientific Research Institute, died on 25 November 1965. During the war and after it (from 1940 to 1947) he worked as deputy and later as chief of the Forecasting Service of the Administration of the Hydrometeorological Service of the Northern Fleet. He began work in the Ukraine in 1947 -- as Deputy Director for Scientific Work of the Kiev Geophysical Observatory and Senior Instructor and Docent of the Department of Meteorology and Climatology of Kiev State University; since February 1954 he had been Director of the Ukrainian Hydrometeorological Sci-

Card 1/2

0933 2215

ACC NR: AP7013731

entific Research Institute. In 1951 he defended his candidate's dissertation, and in 1964 his doctoral dissertation. G. D. Prikhod'ko is the author of about 50 scientific works in the field of investigation of fogs, artificial modification, etc. Under his direction the young institute developed rapidly. He established the Experimental Meteorological Polygon in Dnepropetrovskaya Oblast, which is used by other institutions as well. His work on the artificial modification of clouds and fogs was outstanding. He was chairman of the Scientific Council on the Problem "Artificial Modification of Atmospheric Processes". He coordinated such activity for all organization of the Ukraine. For such work Prikhod'ko was awarded the Gold Medal of the Exhibition of the Attainments of the National Economy USSR. He represented the USSR Hydrometeorological Service at international conferences and meetings. [JPES: 34,593]

Card 2/2

L 38425-66 ENT(1)/FCC GW
ACC NR: AP6024386

SOURCE CODE: UR/0050/66/000/007/0052/0054

AUTHOR: Prikhot'ko, G. F. (Doctor of geographical sciences); Furman, A. I.

ORG: Ukrainian Scientific Research Hydrometeorological Institute
(Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskii institut)

TITLE: Experimental meteorological polygon [controlled test area]

SOURCE: Meteorologiya i gidrologiya, no. 7, 1966, 52-54

TOPIC TAGS: meteorological ~~test area~~, *instrument, climate, control,* fog, ~~dispersion~~, cloud seeding, atmospheric physics, ~~laboratory~~, atmospheric, ~~boundary layer~~, ~~meteorological aircraft~~, radar, meteorology, ~~cloud microphysics~~, *meteorologic research facility, radar observation, atmospheric precipitation*

ABSTRACT: An experimental meteorological polygon [control test area] has been established in the Ukraine to determine whether weather modification techniques can be used successfully to induce precipitation over flat steppe terrain. The test area consists of two 75 x 50-km polygons (3750 km² each), spaced 30 km apart and arranged along an east-west line (see Fig. 1). Cloud-seeding experiments are carried out over the eastern (experimental) area. Only natural precipitation is measured in the western (control) area. Regular meteorological

Card 1/4

UDC: 551.50

L 38425-66

ACC NR: AP6024386

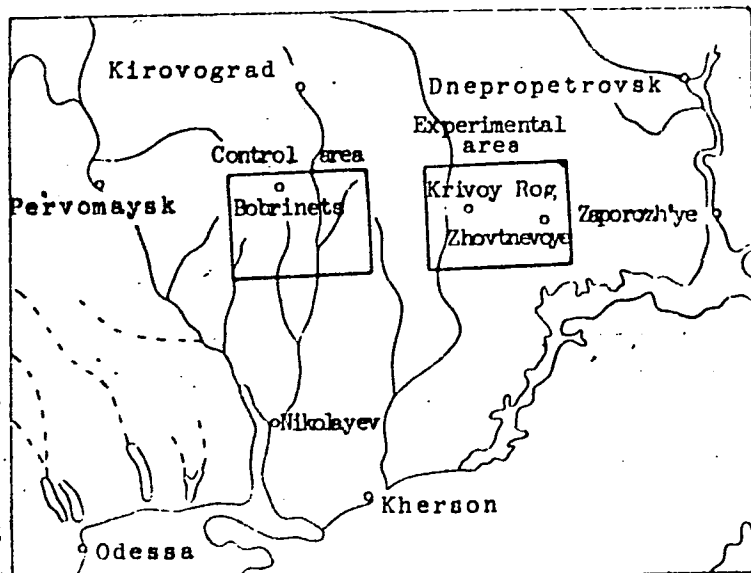


Fig. 1. Schematic showing position of the experimental meteorological polygon of the Ukrainian Scientific Research Hydrometeorological Institute

stations in the test area are located at Krivoy Rog (also an aerological station), Zhovtnevoye, Loshkarevka, and Bobrinets, each station servicing

Card 2/4

L 38425-66

ACC NR: AP6024386

about 10—11 km². "Pluviographs" (currently numbering 255, each servicing an area of 15 km²) have been installed in a regular pattern over the test area to record the time precipitation begins and ends and rainfall amounts. A denser network of these instruments has been established in the center of the experimental area for use in analyzing and evaluating radar methods of precipitation measurements. There are "precipitation gages" at all "pluviograph" stations, and at the remaining stations, "precipitation gages" and rain gages. In winter, snow stakes are set up at all observation stations (observations made twice a day at 0800 and 2000 hr Moscow time). One of the tasks of the Laboratory of the Physics of the Surface Boundary Layer of the Atmosphere located in the village of Zhovtnevoye (experimental area) is to study natural and artificially induced precipitation. This laboratory has a number of groups specializing in various types of observations. One of these groups works on radar studies (cm- and m-range radar). Another group carries out captive balloon studies in the lower 500-m layer of the atmosphere. Specialized actinometric, gradient, and other observations are made by a meteorological group. The polygons are administered from Dnepropetrovsk, which is the base for a group of flyers operating two IL-14 aircraft specially equipped with meteorological instruments. Another group here analyzes and processes the data, and still another is responsible for network inspection functions. Aircraft meteorological instrumentation includes electrical recorders for

Card 3/4